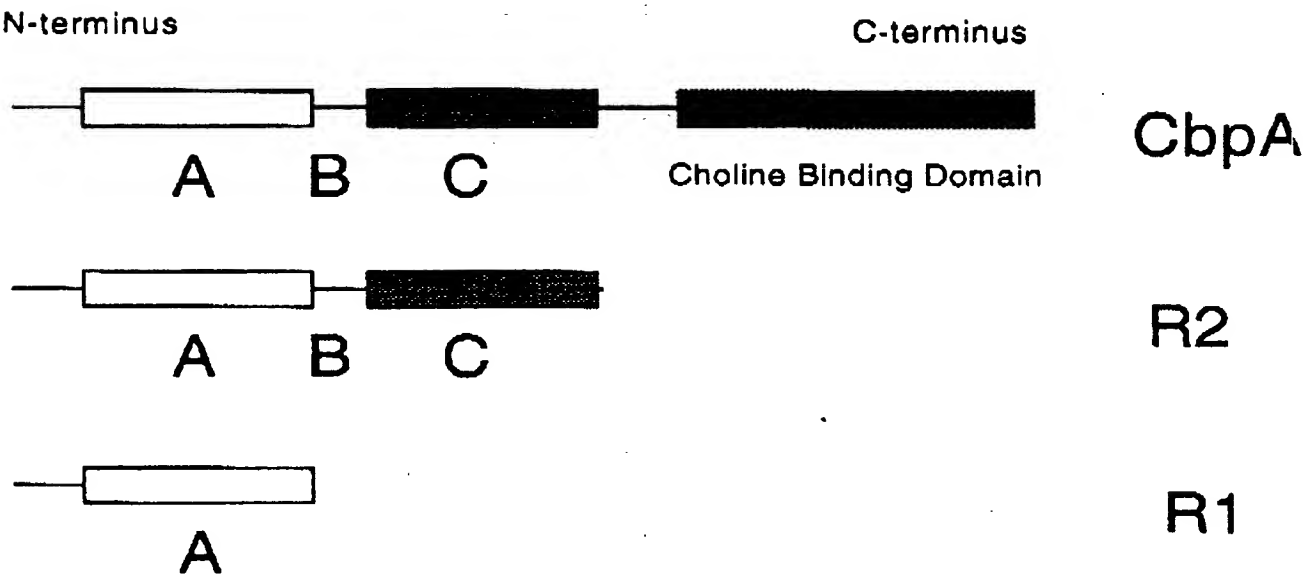
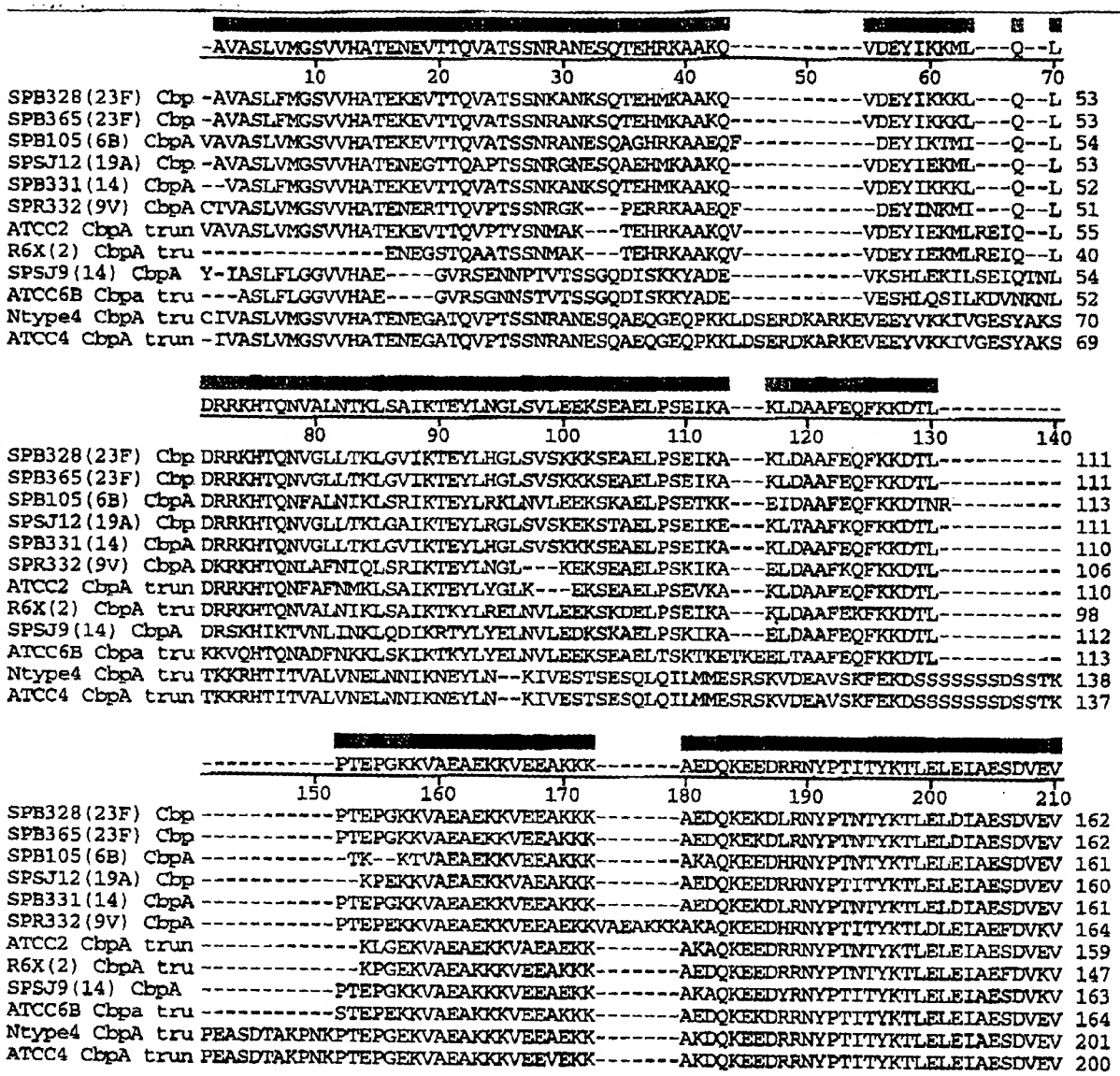

N-terminus
C-terminus
A
B
C
Choline Binding Domain
CbpA
A
B
C
R2
A
R1

Figure 1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10 20 30 40 50 60 70
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SPB365(23F) Cbp -AVASLFMGSVVHATEKEVTTQVATSSNRANKSQTEHMKAAKQ----------VDEYIKKKL---Q--L 53
SPB105(6B) CbpA VAVASLVMGSVVHATEKEVTTQVATSSNRANESQAGHRKAAEQF----------DEYIKTMI---Q--L 54
SPSJ12(19A) Cbp -AVASLVMGSVVHATENEGTTQAPTSSNRGNESQAEHMKAAKQ----------VDEYIEKML---Q--L 53
SPB331(14) CbpA --VASLFMGSVVHATEKEVTTQVATSSNKANKSQTEHMKAAKQ----------VDEYIKKKL---Q--L 52
SPR332(9V) CbpA CTVASLVMGSVVHATENERTTQVPTSSNRGK---PERRKAAEQF----------DEYINKMI---Q--L 51
ATCC2 CbpA trun VAVASLVMGSVVHATEKEVTTQVPTYSNMAK---TEHRKAAKQV----------VDEYIEKMLREIQ--L 55
R6X(2) CbpA tru ----------ENEGSTQAATSSNMAK---TEHRKAAKQV----------VDEYIEKMLREIQ--L 40
SPSJ9(14) CbpA Y-IASLFLGGVVHAE----GVRSENNPTVTSSGQDISKKYADE----------VKSHLEKILSEIQTNL 54
ATCC6B Cbpa tru ---ASLFLGGVVHAE----GVRSGNNSTVTSSGQDISKKYADE----------VESHLQSILKDVNKNL 52
Ntype4 CbpA tru CIVASLVMGSVVHATENEGATQVPTSSNRANESQAEQGEQPKKLDSERDKARKEVEEYVKKIVGESYAKS 70
ATCC4 CbpA trun -IVASLVMGSVVHATENEGATQVPTSSNRANESQAEQGEQPKKLDSERDKARKEVEEYVKKIVGESYAKS 69
DRRKHTQNVALNTKLSAIKTEYLNGLSVLEEKSEAELPSEIKA---KLDAAFEQFKKDTL----------
80 90 100 110 120 130 140
SPB328(23F) Cbp DRRKHTQNVGLLTKLGVIKTEYLHGLSVSKKKSEAELPSEIKA---KLDAAFEQFKKDTL---------- 111
SPB365(23F) Cbp DRRKHTQNVGLLTKLGVIKTEYLHGLSVSKKKSEAELPSEIKA---KLDAAFEQFKKDTL---------- 111
SPB105(6B) CbpA DRRKHTQNFALNIKLSRIKTEYLRKLNVLEEKSKAELPSETKK---EIDAAFEQFKKDINR---------- 113
SPSJ12(19A) Cbp DRRKHTQNVGLLTKLGAIKTEYLRGLSVSKEKSTAELPSEIKE---KLTAAFKQFKKDTL---------- 111
SPB331(14) CbpA DRRKHTQNVGLLTKLGVIKTEYLHGLSVSKKKSEAELPSEIKA---KLDAAFEQFKKDTL---------- 110
SPR332(9V) CbpA DKRKHTQNLAFNIQLSRIKTEYLNGL---KEKSEAELPSKIKA---ELDAAFKQFKKDTL---------- 106
ATCC2 CbpA trun DRRKHTQNFAFNMKLSAIKTEYLYGLK---EKSEAELPSEVKA---KLDAAFEQFKKDTL---------- 110
R6X(2) CbpA tru DRRKHTQNVALNIKLSAIKTKYLRELNVLEEKSKDELPSEIKA---KLDAAFEKFKKDTL---------- 98
SPSJ9(14) CbpA DRSKHIKTVNLINKLQDIKRTYLYELNVLEDKSKAELPSKIKA---ELDAAFEQFKKDTL---------- 112
ATCC6B Cbpa tru KKVQHTQNADFNKKLSKIKTKYLYELNVLEEKSEAELTSKTKETKEELTAAFEQFKKDTL---------- 113
Ntype4 CbpA tru TKKRHTITVALVNELNNIKNEYLN--KIVESTSESQLQILMMESRSKVDEAVSKFEKDSSSSSSSDSSTK 138
ATCC4 CbpA trun TKKRHTITVALVNELNNIKNEYLN--KIVESTSESQLQILMMESRSKVDEAVSKFEKDSSSSSSSDSSTK 137
----------PTEPGKKVAEAEKKVEEAKKK-------AEDQKEEDRRNYPTITYKTLELEIAESDVEV
150 160 170 180 190 200 210
SPB328(23F) Cbp ----------PTEPGKKVAEAEKKVEEAKKK-------AEDQKEKDLRNYPTNTYKTLELDIAESDVEV 162
SPB365(23F) Cbp ----------PTEPGKKVAEAEKKVEEAKKK-------AEDQKEKDLRNYPTNTYKTLELDIAESDVEV 162
SPB105(6B) CbpA ----------TK--KTVAEAEKKVEEAKKK-------AKAQKEEDHRNYPTNTYKTLELEIAESDVEV 161
SPSJ12(19A) Cbp ----------KPEKKVAEAEKKVAEAKKK-------AEDQKEEDRRNYPTITYKTLELEIAESDVEV 160
SPB331(14) CbpA ----------PTEPGKKVAEAEKKVEEAKKK-------AEDQKEKDLRNYPTNTYKTLELDIAESDVEV 161
SPR332(9V) CbpA ----------PTEPEKKVAEAEKKVEEAEKKVAEAKKKAKAQKEEDHRNYPTITYKTLDLEIAEFDVKV 164
ATCC2 CbpA trun ----------KLGEKVAEAEKKVAEAEKK-------AKAQKEEDRRNYPTNTYKTLELEIAESDVEV 159
R6X(2) CbpA tru ----------KPGEKVAEAKKKVEEAKKK-------AEDQKEEDRRNYPTNTYKTLELEIAEFDVKV 147
SPSJ9(14) CbpA ----------PTEPGKKVAEAKKKVEEAEKK-------AKAQKEEDYRNYPTITYKTLELEIAESDVKV 163
ATCC6B Cbpa tru ----------STEPEKKVAEAKKKVEEAKKK-------AEDQKEKDRRNYPTITYKTLELEIAESDVEV 164
Ntype4 CbpA tru PEASDTAKPNKPTEPGEKVAEAKKKVEEAEKK-------AKDQKEEDRRNYPTITYKTLELEIAESDVEV 201
ATCC4 CbpA trun PEASDTAKPNKPTEPGEKVAEAKKKVEEVEKK-------AKDQKEEDRRNYPTITYKTLELEIAESDVEV 200

Figure 2A

```
                     KKAELELVKEEAKESRDEGKINQAKAKVESKKAEATRLKKIKTDREKAEEE-AKRRADAKLQEA---NVA
                            220       230       240       250       260       270       280
SPB328(23F) Cbp      KKAELELVKEEAKESRDEKKINQAKAKVENKKAEATRLKNIKTDREKAEE--AKRRADAKLQEA---NVA 227
SPB365(23F) Cbp      KKAELELVKEEAKESRDEKKINQAKAKVENKKAEATRLKNIKTDREKAEE--AKRRADAKLQEA---NVA 227
SPB105(6B) CbpA      KKAELELVKEEAKESRDDEKIKQAEAKVESKKAEATRLENIKTDREKAEEE-AKRRAEAKLKEAVEKNVA 230
SPSJ12(19A) Cbp      KKAELELVKVKANEPRDEEKIKQAEAEVESKKAEATRLKKIKTDREKAEEE-AKRRVDAKEQDE------ 224
SPB331(14) CbpA      KKAELELVKEEAKESRDEKKINQAKAKVENKKAEATRLKNIKTDREKAEE--AKRRADAKLQEA---NVA 226
SPR332(9V) CbpA      KEAELELVKKEADESRNEGTINQAKAKVESEKAEATRLKKIKTDREKAEEEEAKRRADAKEQDE------ 229
ATCC2 CbpA trun      KKAELELLKEEAK-TRNEDTINQAKAKVESKKAEATKLEEIKTDRKKAEEE-AKRKAEAEE-D----KVK 222
R6X(2) CbpA tru      KEAELELVKEEAKESRNEGTIKQAKEKVESKKAEATRLENIKTDRKKAEEE-AKRKADAKLKEA---NVA 213
SPSJ9(14) CbpA      KEAELELVKKEADESRNEGTINQAKAKVESEQAEATRLKKIKTDREKAEE-EAKRRADAKEQDE------ 227
ATCC6B Cbpa tru     KKAELELVKVKANEPRDEEKIKQAEAKVESKQAEATRLKKIKTDREQAEATRLENIKTDREQAEEEAKVK 234
Ntype4 CbpA tru     KKAELELVKVKANEPRDEQKIKQAEAEVESKQAEATRLKKIKTDREEAEEE-AKRRADAK---------- 261
ATCC4 CbpA trun     KKAELELVKVKANEPRDKQKIKQAEAEVESKQAEATRLKKIKTDREEAEEE-AKRRADAK---------- 260

                     -SEQDKPKGRAKRGVPGELATPDKKENDAKSSDSSVGEETLPSPSLKPEKKVAEAEKKVEEAKKKAEDQK
                            290       300       310       320       330       340       350
SPB328(23F) Cbp      TSEQDKSKRRAKREVXGELATPDKKENDAKSSDSSVGEETLTSPSLKPEKKVAEAEKKVEEAKKKAEDQK 297
SPB365(23F) Cbp      TSEQDKSKRRAKREVLGELATPDKKENDAKSSDSSVGEETLTSPSLKPEKKVAEAEKKVEEAKKKAEDQK 297
SPB105(6B) CbpA      TSEQDKPKGRRKRGVPGEQATPDKKENDAKSSDSSVGEEALPSPSLKPEKKVAEAEKKVAEAEKKAKAQK 300
SPSJ12(19A) Cbp      -S-SKRRKSRXKRGDVGEQATPDKKENDAKSSDSSVGEETLPSPSLKPGKKVAEAEKKVEEADKKAKAQK 291
SPB331(14) CbpA      TSEQDKSKRRAKREVFGELATPDKKENDAKSSDSSVGEETLTSPSLKPEKKVAEAEKKVEEAKKKAEDQK 296
SPR332(9V) CbpA      ---SKRRKSRGKRGALGEQATPDKKENDAKSSDSSVGEETLPSPSLKPGKKVAEAEKKVEEADKKAKAQK 295
ATCC2 CbpA trun      ----DKLKRRTKRAVPGEPATPDKKENDAKSSDSSVGEETLPSPSLKSGKKVAEAEKKVAEAEKKAKDQK 288
R6X(2) CbpA tru      TSDQGKPKGRAKRGVPGELATPDKKENDAKSSDSSVGEETLPSSSLKSGKKVAEAEKKVEEAEKKAKDQK 283
SPSJ9(14) CbpA      -S--KRRKSRVKRGDFGEPATPDKKENDAKSSDSSVGEETLPSPSLKPGKKVAEAEKKVEEAEKKAKDQK 293
ATCC6B Cbpa tru     ----DEPKKRTKRGVLGEPATPDKKENDAKSSDSSVGEETLPSPSLKPEKKVAEAEKKVEEAKKKAEDQK 300
Ntype4 CbpA tru     --EQGKPKGRAKRGVPGELATPDKKENDAKSSDSSVGEETLPSPSLKPEKKVAEAEKKVEEAKKKAEDQK 328
ATCC4 CbpA trun     --EQGKPKGRPKRGVPGELATPDKKENDAKSSDSSVGEETLPSPSLKPEKKVAEAEKKVEEAKKKAEDQK 327

                     EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKESRNEEKVKQAKAEVESKKAEATRLEKIKTD
                            350       370       380       390       400       410       420
SPB328(23F) Cbp      EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKESRNEEKIKQVKAKVESKKAEATRLENIKTD 367
SPB365(23F) Cbp      EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKESRNEEKIKQVKAKVESKKAEATRLENIKTD 367
SPB105(6B) CbpA      EEDRRNYPTNTYKTLELEIAESDVKVKEAELELVKEEAKESRNEEKVNQAKAKVESKKAEATRLEKIKTD 370
SPSJ12(19A) Cbp      EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKEPRNEEKVKQAKAEVESKKAEATRLEKIKTD 361
SPB331(14) CbpA      EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKESRNEEKIKQVKAKVESKKAEATRLENIKTD 366
SPR332(9V) CbpA      EEDRRNYPTNTYKTLELEIAESDVKVKEAELELVKEEAKESRNEEKIKQAKAKVESKKAEATRLEKIKTD 365
ATCC2 CbpA trun      EEDRRNYPTNTYKTLDLEIAESDVKVKEAELELVKEEAKGSRNEEKINQAKAEVESKKAEATRLEKIKTD 358
R6X(2) CbpA tru      EEDRRNYPTNTYKTLDLEIAESDVKVKEAELELVKEEAKEPRDEEKIKQAKAKVESKKAEATRLENIKTD 353
SPSJ9(14) CbpA      EEDHRNYPTITYKTLELEIAESDVEVKKAELELVKEEAKGSRNEEKVKQAKAEVESKKAEATRLEKIKTD 363
ATCC6B Cbpa tru     EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKEPRNEEKVKQAKAEVESKQAEATRLENIKTD 370
Ntype4 CbpA tru     EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKEPRNEEKVKQAKAEVESKKAEATRLEKIKTD 398
ATCC4 CbpA trun     EEDRRNYPTNTYKTLELEIAESDVEVKKAELELVKEEAKEPRNEEKVKQAKAEVESKKAEATRLEKIKTD 397

                     RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPQPEKPAEEPENPAPAP-PKPENPAEQPKAEKPADQQA
                            430       440       450       460       470       480       490
SPB328(23F) Cbp      RKKAEEEEAKRRAAEEDKVKEKPAEQPQPAPAPQPEKPTEEPENPAPAPAPKPENPAEKPKAEKPADQQA 437
SPB365(23F) Cbp      RKKAEEEEAKRRAAEEDKVKEKPAEQPQPAPAPQPEKPTEEPENPAPAPAPKPENPAEKPKAEKPADQQA 437
SPB105(6B) CbpA      RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPQPEKPTEEPENPAPAP--KPEKPAEQPKAEKTDDQQA 437
SPSJ12(19A) Cbp      RKKAEEE-AKRKAAEEDKVKEKPAEQPKPAPAPQPEKPA---------P--KPENPAEQPKAEKPADQQA 419
SPB331(14) CbpA      RKKAEEEEAKRRAAEEDKVKEKPAEQPQPAPAPQPEKPTEEPENPAPAPAPKPENPAEKPKAEKPADQQA 436
SPR332(9V) CbpA      RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPQPEKPAEEPENPVPAP--KPENPAEQPKAEKPADQQA 432
ATCC2 CbpA trun      RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPQPEKPTEEPENPAPA--PKPEKPAEQPKAEKTDDQQA 425
R6X(2) CbpA tru      RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPATQPEKP---------A--PKPEKPAEQPKAEKTDDQQA 411
SPSJ9(14) CbpA      RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPQPEKPAP-------A--PKPENPAEQPKAEKPADQQA 423
ATCC6B Cbpa tru     RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPQPEKPAPKPEKPAPA--PKPENPAEQPKAEKPADQQA 437
Ntype4 CbpA tru     RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPKAEKPA---------PAPKPENPAEQPKAEKPADQQA 458
ATCC4 CbpA trun     RKKAEEE-AKRKAAEEDKVKEKPAEQPQPAPAPKTEKPA---------PAPKPENPAEQPKAEKPADQQA 457

                     EE--

SPB328(23F) Cbp     EE                                                                    439
SPB365(23F) Cbp                                                                           437
SPB105(6B) CbpA     EE                                                                    439
SPSJ12(19A) Cbp                                                                           419
SPB331(14) CbpA     E                                                                     437
SPR332(9V) CbpA     E                                                                     433
ATCC2 CbpA trun     EE                                                                    427
R6X(2) CbpA tru     EE                                                                    413
SPSJ9(14) CbpA     EE                                                                    425
ATCC6B Cbpa tru     EE                                                                    439
Ntype4 CbpA tru     EE                                                                    460
ATCC4 CbpA trun     EE                                                                    459
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Figure 2B

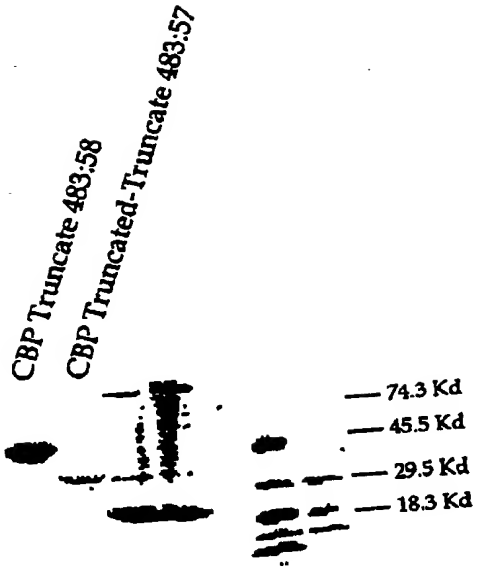
CBP Truncate 483:58
CBP Truncated-Truncate 483:57
74.3 Kd
45.5 Kd
29.5 Kd
18.3 Kd

Figure 3

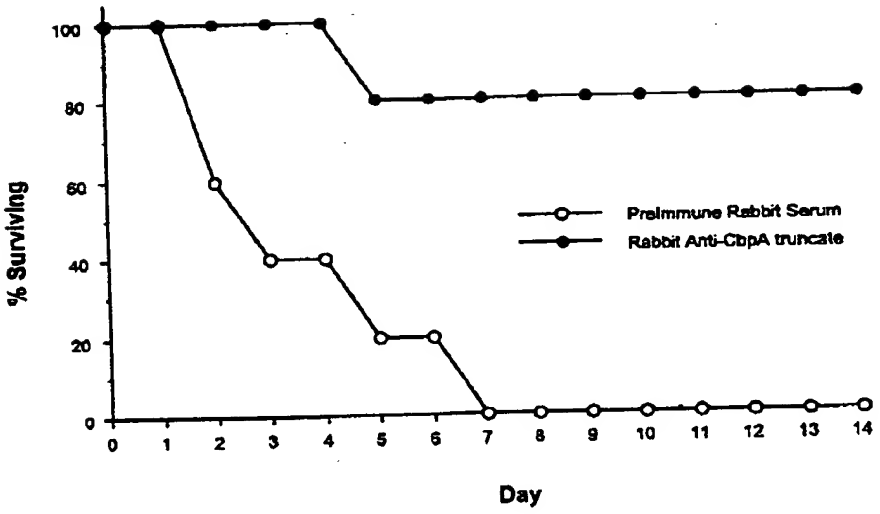
100
80
60
40
20
0
% Surviving
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Day
Preimmune Rabbit Serum
Rabbit Anti-CbpA truncate

Figure 4

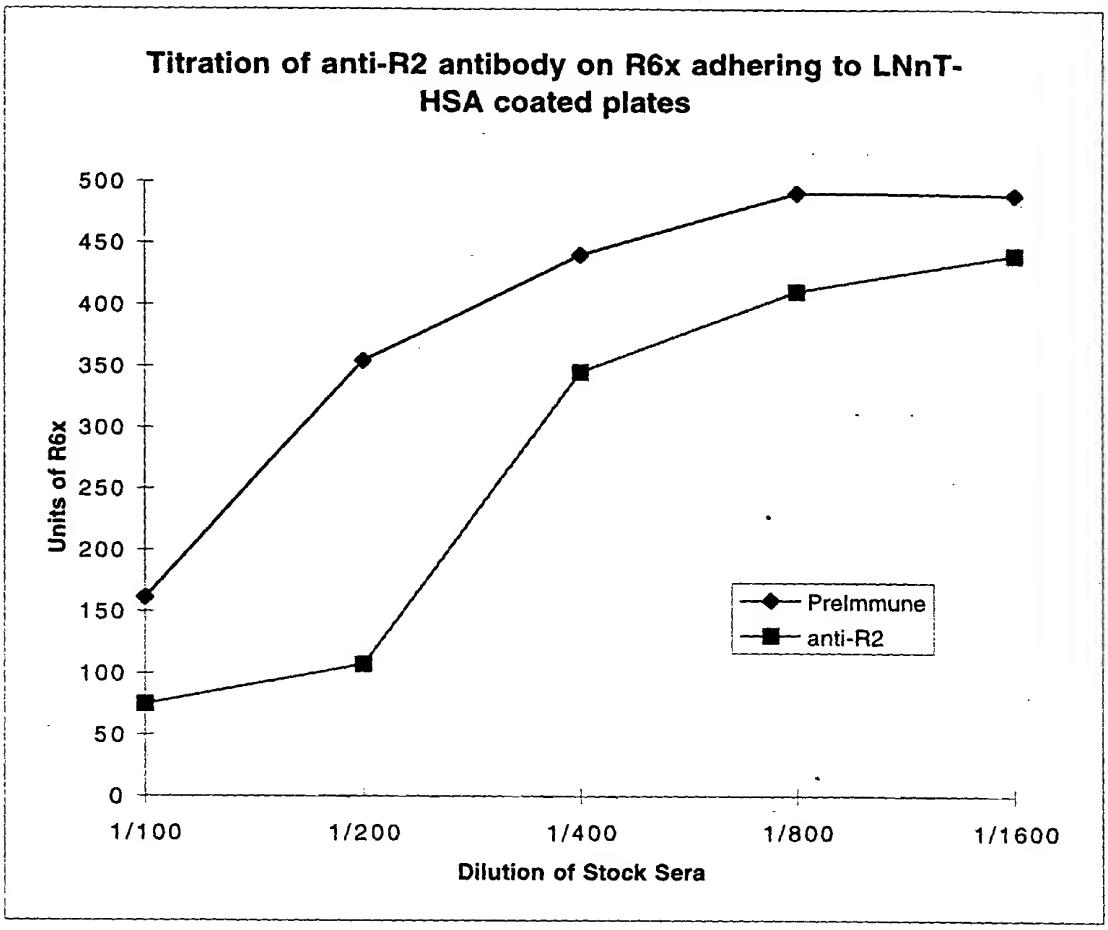
Titration of anti-R2 antibody on R6x adhering to LNnT-HSA coated plates
Units of R6x
500
450
400
350
300
250
200
150
100
50
0
1/100
1/200
1/400
1/800
1/1600
Dilution of Stock Sera
PreImmune
anti-R2

Figure 5

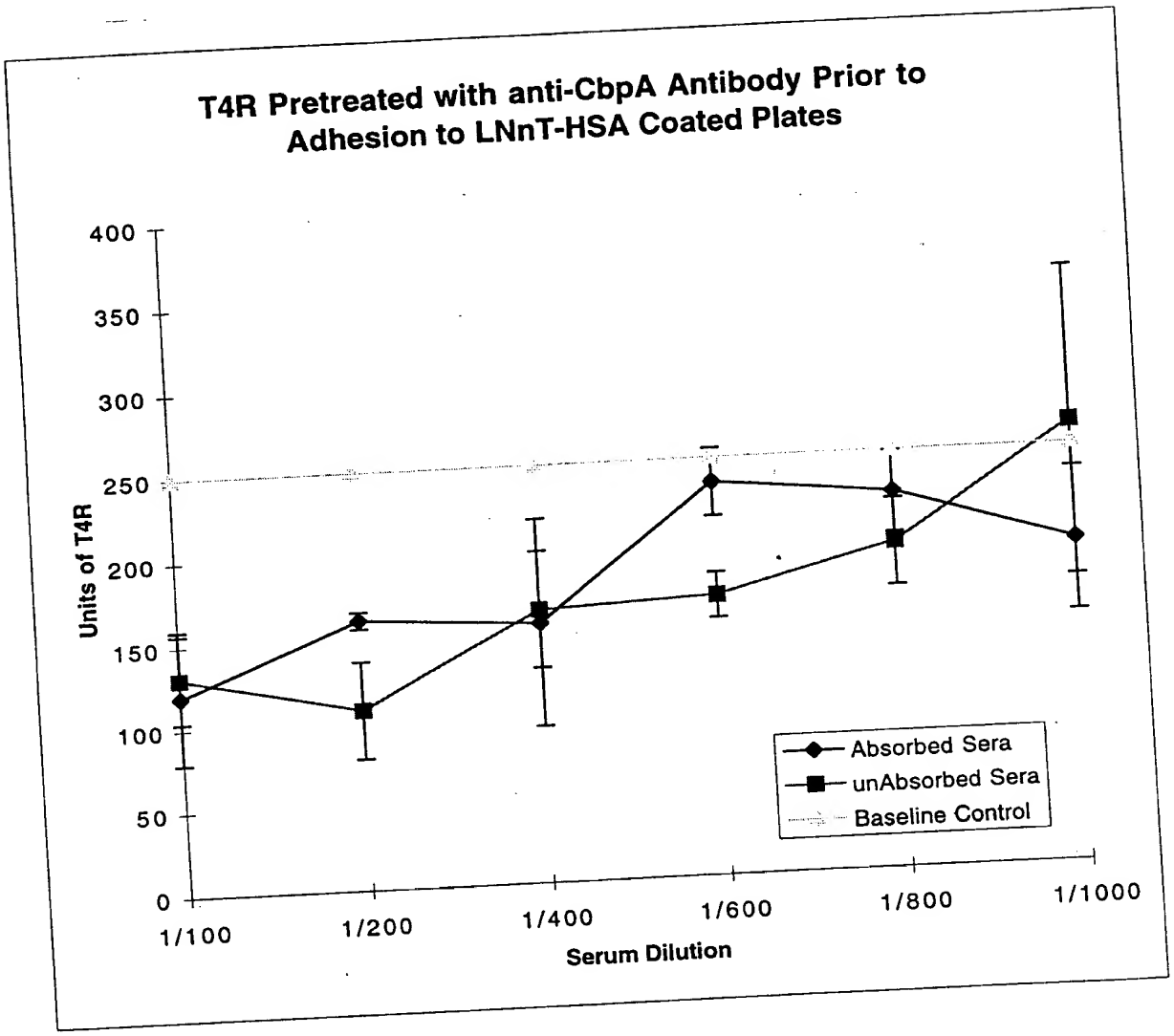
T4R Pretreated with anti-CbpA Antibody Prior to Adhesion to LNnT-HSA Coated Plates
Units of T4R
400
350
300
250
200
150
100
50
0
1/100
1/200
1/400
1/600
1/800
1/1000
Serum Dilution
Absorbed Sera
unAbsorbed Sera
Baseline Control

Figure 6

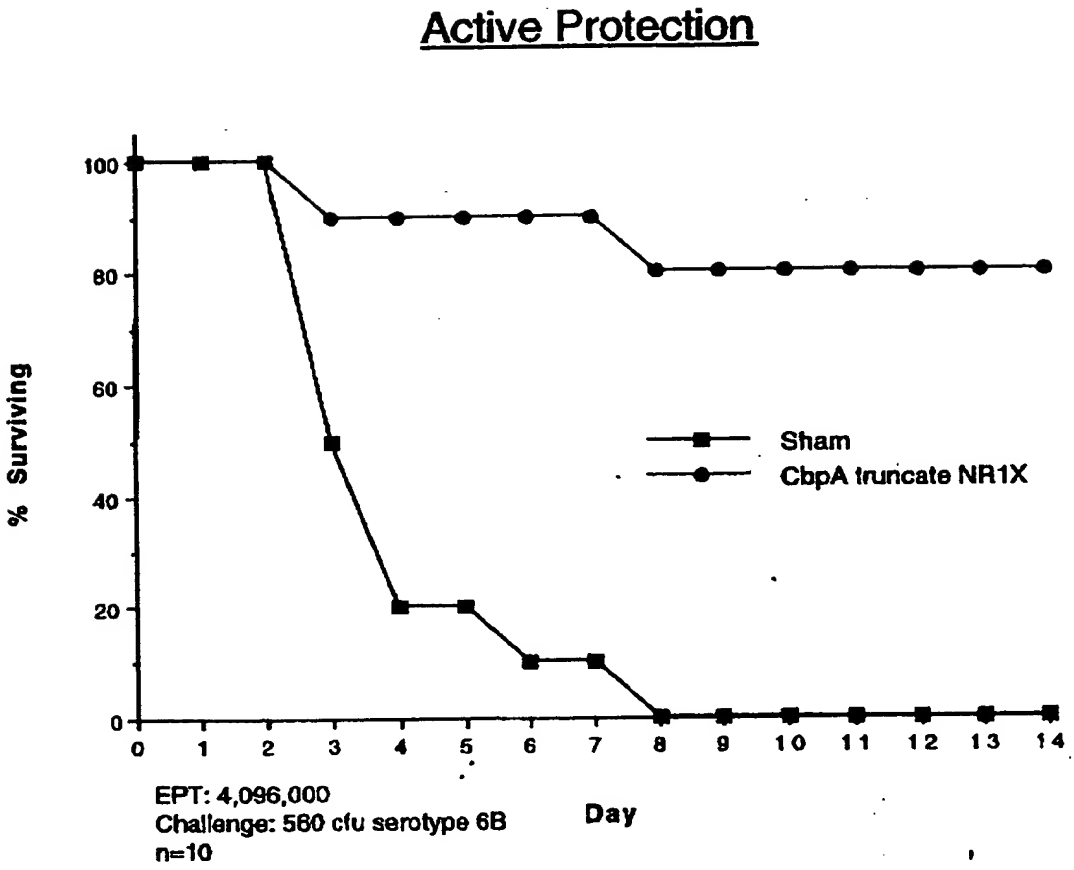
Active Protection
% Surviving
100
80
60
40
20
0
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
Day
Sham
CbpA truncate NR1X
EPT: 4,096,000
Challenge: 560 cfu serotype 6B
n=10

Figure 7